Emerging Zoonotic Diseases

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Office of Infectious Disease Services

Arizona Department of Health Services

Emerging/Remerging Zoonoses

- Dr. Julie Gerberding, Director CDC: "11 of the last 12 emerging infectious diseases that we're aware of in the world, that have had human health consequences, have probably arisen from animal sources."

Bats & SARS

- Horseshoe bats (*Rhinolophus* sp.) identified as reservoir host of SARS-like viruses
- 408 bats, 3 families, 6 genera, 9 species- serosurvey, PCR, and virus isolation
- Only 7-8% difference in base pairs b/w bat & human SARS isolates
- Civets-
  - farmed animals, exposed to bats at markets, based on serology at farms vs. markets
  - may only be susceptible host, instead of reservoir
- Study presented by Linfa Wang of Australian Animal Health Lab

Bats as reservoir for emerging zoonoses

- "Bats chosen for survey- able to carry & transmit viruses for a long time without showing symptoms"
- Other examples: fruit bats considered as reservoir host for Nipah and Ebola viruses, based on similar studies
- Prevention measures:
  - restrict capture & sale of live bats
  - ban mixing of live bats with other live animals
  - Separate animal farms from bat roosting areas

LCMV

- Summer 2005
- Lymphocytic Choriomeningitis Virus (LCMV) Infection in Organ Transplant Recipients - Massachusetts, Rhode Island
- LCMV- rodent-borne Old World arenavirus
- 4 organ recipients with a common donor- evidence of infection

LCMV host

- primary host = common house mouse, *Mus musculus*
- ~ 5% of mice throughout the United States carry LCMV; prevalence 3%-40%
- saliva, urine, & feces of infected mice
- Other types of rodents, such as hamsters = NOT natural reservoirs
- Domesticated rodents can become infected from wild mice
- Humans- more likely to contract LCMV from house mice

LCMV in humans

- LCMV infection usually asymptomatic or causes mild self-limited illness in otherwise healthy persons
- aseptic meningitis, but rarely fatal
- Infection during pregnancy can result in vertical transmission from mother to fetus
- infection during 1st or 2nd trimesters- severe illness in the fetus

Organ Donor

- April 2005 in Rhode Island
- Donor- woman with history only for hypertension & 1 week of headache
- sudden onset of hemiplegia caused by stroke, brainstem herniation & brain death within 3 days
- evaluation not suggestive of infection

Organ recipients become ill

- Within 3 weeks after transplantation 4 persons who received liver, lungs, & two kidneys
  - abnormalities of liver function & blood coagulation
  - dysfunction of transplanted organ
- Symptoms varied: fever, localized rash, diarrhea, hyponatremia, thrombocytopenia, hypoxia, & kidney failure
- 3 out of 4 solid organ recipients died
- Necropsy: hepatocellular necrosis
- two cornea recipients were asymptomatic

Diagnosis

- transplant-transmitted infection suspected
- tissue & blood samples from donor & recipients from the Rhode Island DOH & Massachusetts DOPH sent to CDC
- All recipients + for LCMV on IHC, RT-PCR, ELISA & viral culture
- surviving kidney transplant recipient treated with IV ribavirin & reduction in immunosuppressive drug regimen; patient improved

Epi Investigation

- Interviews with hospital & organ bank staff members revealed no likely sources of LCMV infection in hospital or organ-recovery settings
- limited opportunities for exposure to wild rodents at home & work
- pet hamster acquired recently, cared for primarily by another family member
- No illnesses compatible with LCMV had been reported in the donor or family members during the month preceding the donor's death

Lab investigation

- Family members of donor tested for LCMV antibodies
- family member who cared for hamster had specific IgM & IgG antibodies to LCMV
- No other family member had detectable IgG or IgM antibodies to LCMV
- no evidence of LCMV from remaining donor tissues by serology, IHC, RT-PCR, or viral culture
- **pet hamster positive for LCMV by virus isolation, RT-PCR, & IHC**
- source of infection likely was hamster in donor's home

Previous Investigations

- 1975 - large outbreak associated with pet hamsters sold by a single distributor
  - 181 symptomatic cases among persons with hamster contact identified in 12 states; no deaths occurred
- 2003- cluster of solid organ transplant-associated meningoencephalitis deaths in Wisconsin associated with LCMV
  - testing of donor tissues did not reveal any evidence of infection & no exposures to rodents were found Acute

Trace back of Hamster

- testing of other rodents at local pet store revealed 3 LCMV-infected rodents (2 hamsters & guinea pig) supplied by a single distributor (distributor A)
- testing of hamsters from distributor A
  - infection rate of ~3%
  - distributor A under quarantine until documented as free of LCMV infection
- Trace forward from distributor to local pet stores in several states
- Quarantine of pet stores & destruction of those rodents – state by state decision

Site Contents

- Mission Statement
- Disease / Virus Information
  - Arenaviruses
  - Crimean-Congo Hemorrhagic Fever
  - Ebola Hemorrhagic Fever
  - Filoviruses
  - Hantavirus Pulmonary Syndrome
  - Hemorrhagic Fever with Renal Syndrome
  - Hendra Virus Disease
  - Lassa Fever
  - Lymphocytic Choriomeningitis
  - Marburg Hemorrhagic Fever
  - Nipah Virus Encephalitis
  - Rift Valley Fever
  - Tick-borne Encephalitis
  - Viral Hemorrhagic

Lymphocytic Choriomeningitis Home >

Information for Pet Owners: Reducing the Risk of Becoming Infected with LCMV from Pet Rodents

Download PDF version formatted for print (30 KB/3 pages)

What happened recently to bring attention to LCMV?

to top

In May 2005, CDC received reports of four solid organ-transplant recipients with unknown illness. All were infected with lymphocytic choriomeningitis virus (LCMV) from a common organ donor. Three of the four organ recipients died from LCMV infection.

Epidemiologic investigation traced the source of the virus to a pet hamster recently purchased by the donor from a pet store in Rhode Island. LCMV testing of other rodents at the pet store identified three other LCMV-infected rodents (two hamsters and a guinea pig). All four pet rodents had been supplied by a single distributor, MidSouth Distributors in Ohio. During this investigation, it was determined that LCMV-infected pet rodents might have been transported from the Ohio facility to pet stores in the northeastern and midwestern United States as early as February 2005.

Where does the virus come from?

to top

The primary host of LCMV is the common house mouse (Mus musculus). LCMV is not normally found in pet rodents, such as hamsters, gerbils, and guinea pigs. However, pet rodents can become infected after being in contact with wild house mice in breeding facilities, pet stores, or homes. People have become infected from contact with LCMV-infected hamsters.

Humans can develop LCMV infection from exposure to urine, droppings, saliva, or nesting material of infected rodents. LCMV infection can also occur when these materials are inhaled or directly introduced into broken skin or into the nose, eyes, or mouth, and possibly by a bite from an infected animal.

What are the symptoms of LCMV in people?

to top

Adults with normal immune systems can be infected with LCMV without symptoms, or they may develop a mild illness with

Address http://www.cdc.gov/healthypets/lcmv_rodents.htm

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CDC Home | Search | Health Topics A-Z

CDC SAFER·HEALTHIER·PEOPLE™

National Center for Infectious Diseases

Healthy Pets Healthy People

HPHP Home | Health Benefits | Contact Us

Health Information

- Browse by Animal
- Browse by Disease

Prevention Tools

- For People at Extra Risk
- For Health Professionals

Go To...

- Glossary
- Resources
- Foodborne and Diarrheal Diseases Branch

Lymphocytic Choriomeningitis Virus from Pet Rodents

Rodents, such as mice, hamsters and guinea pigs, are popular as pets in many households. However, not all rodents that enter homes are intended as pets: some rodents are brought into homes as feed for other animals (e.g., pet snakes), and others, such as the house mouse, are pests that find their own way into homes. This fact sheet is intended to provide information about lymphocytic choriomeningitis virus (LCMV), which can be transmitted to humans by rodents, including wild and pet mice, hamsters, and, on occasion, guinea pigs.

What is LCMV?

LCMV is carried by rodents and can be passed to humans. Not all people who are exposed to the virus become ill. Signs and symptoms of LCMV infection are similar to those for influenza and include fever, stiff neck, malaise, anorexia (lack of appetite), muscle aches, headache, nausea, and vomiting. Symptoms occur 1–2 weeks after exposure.

How is LCMV transmitted to humans?

The house mouse, a wild rodent found near and in homes, is the primary host of this virus. Humans can develop LCMV infection from exposure to rodent urine, droppings, saliva, or nesting material of infected rodents. Virus transmission can also occur when these materials are directly introduced into broken skin or into the nose, eyes, or mouth or by a bite from an infected animal. Pet rodents, such as hamsters and guinea pigs, can become infected with LCMV

Lymphocytic Choriomeningitis Virus (LCMV)

SEAL UP!

HOW TO KEEP RODENTS OUT OF YOUR HOME

- ☐ Seal up gaps around roofing, attic spaces, windows and doors.
- ☐ Examine the outside of your house for gaps between the foundation and the ground.
- ☐ Inspect for gaps under the sink and locations where water pipes come into your home.
- ☐ Check around vents and air conditioners for holes.
- ☐ Seal any gaps or holes with steel wool, lath metal or caulk.

TRAP UP!

HOW TO USE SNAP TRAPS

- ☐ Fix gaps in trailer skirting.
- ☐ Select an appropriate trap - some are for mice and some are for rats.
- ☐ Read the instructions on the box before setting the snap trap. Set away from children and pets.
- ☐ Place chunky peanut butter the size of a pea on the bait pan on the snap trap.
- ☐ Position the bait end of the trap next to the wall so it forms a "T" with the wall.
- ☐ Place snap traps in areas where you have seen rodents, nesting materials, urine or droppings.

CLEAN UP!

HOW TO KEEP A CLEAN AND HEALTHY HOME

How to clean up rodents and rodent droppings:

- ☐ Wear rubber or plastic gloves when handling dead rodents or rodent droppings.
- ☐ Spray dead rodent, urine or droppings with a disinfectant or a mixture of bleach and water.
- ☐ Soak rodent, nesting materials or droppings in solution for five minutes before wiping up with paper towel or rag as appropriate.
- ☐ Place the paper towel and rodent with trap or nesting material in a plastic bag and seal it.
- ☐ Place the full bag in a second plastic bag and seal it.
- ☐ Mop or sponge the area with a disinfectant or bleach solution.
- ☐ Wash hands with soap and water after taking off your gloves (or use a waterless alcohol-based hand rub when soap is not available and hands are not visibly soiled).

Clean up rodent food sources and nesting sites

- ☐ Place human and pet food in thick plastic or metal containers with tight lids.
- ☐ Wash dishes and cooking utensils soon after use.
- ☐ Put pet food away in rodent-proof containers after use. Do not leave pet-food or water bowls out overnight.
- ☐ Place garbage in thick plastic or metal can with a tight lid.

tion Checklist

Arizona Department of Health Services

Birth Defects

Lymphocytic Choriomeningitis Virus (LCMV) and Pregnancy: Facts and Prevention

Download LCMV Q&A Factsheet

Acrobat (.pdf)

Photo produced for CDC by Orkin, Inc.

What is LCMV and how is it spread?

Lymphocytic choriomeningitis virus (LCMV) is carried by wild mice. Laboratory rodents and pet rodents, such as hamsters and guinea pigs, can

Topic Contents

- Topic Home
- Basic Facts
- Monitoring Birth Defec
- Research
- Prevention
- Genetics

Quick Links

Related Links
Folic Acid
Fetal Alcohol Syndrome
Genomics and Disease Prevention

Contact Info

Thank you for visiting the CDC-NCBDDD Web site. Click here to contact the National Center on Birth Defects and Developmental Disabiliti

We are not able to answer personal medical questions. Please see your health care provider concerning appropriate care, treatment, or other medical advice.

Programs & Campaigns

Pregnancy-Planning Education Program

LCMV

- **American Animal Hospital Association: "CDC Asks Veterinary Community to Educate Clients About LCMV"**

December 28, 2005 Vol. 3, Issue 26

TODAY'S TOPICS

TAKE NOTE

Tainted Dog Food Alert
Dogs in 22 states may have been exposed to tainted food. Read more.

Female Deans Impact Industry
Dr. Elizabeth Stone plans to expand the consumer perception of

CDC Asks Veterinary Community to Educate Clients About LCMV

Last spring Lymphocytic Choriomeningitis (LCMV), a virus common in field mice, hit the consumer news when three human transplant patients died after becoming infected by pet hamsters. The virus was traced to a group of 70,000 hamsters from breeding and distribution facilities in Arkansas and Ohio. At least 22 states received the animals, according to professionals at the Centers for Disease Control & Prevention (CDC), who want veterinarians to warn clients about the risks associated with owning these animals. The main concern is for pregnant women and immune-compromised patients. *NEWStat* ran a story in June 2005, when the news first hit.

"We are trying not to scare the public but it's a delicate balance," said Abbigail Tumpey, MPH, CDC spokesperson. "Our advice to pregnant women is to not own pet or wild rodents, period."

California and Connecticut have added LCMV as a reportable, communicable disease, and other states are expected to follow suit, Tumpey said. The CDC investigation shows that a wild rodent infestation infected a population of hamsters at the facilities with LCMV, which is transmitted through urine, droppings and saliva. The disease, which is not airborne, can be aerosolized, Tumpey said. It is normally found in the field mice population, but "it should not be in the pet rodent population," she added.

Infected rodents do not show symptoms so veterinarians may

vices

Arizona Department of Health Services

Salmonellosis – "Pocket Pets"

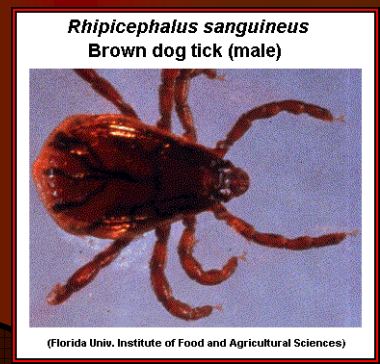
- 2004 – Minnesota DOH led a multi state investigation of Multidrug-resistant *Salmonella* Typhimurium (MMWR article May 2005)
- Associated with commercially distributed pet rodents - diarrhea
- PFGE of isolate from one case's pet mouse matched PFGE of hamsters from a pet distributor in Minnesota
- 15 infections, 10 states
- Exposures – hamsters, mice/rats – both pet and those for feeding snakes
- Median age – 16 yrs; 7 cases – 7 yrs or younger
- 6 cases hospitalized

Salmonellosis
as Zoonosis from Pets

- animals with higher frequency of *Salmonella* shedding in their feces:
  - Reptiles
  - young animals
  - animals with diarrhea
- outbreaks also reported after handling pet chicks, ducklings, kittens, & hedgehogs

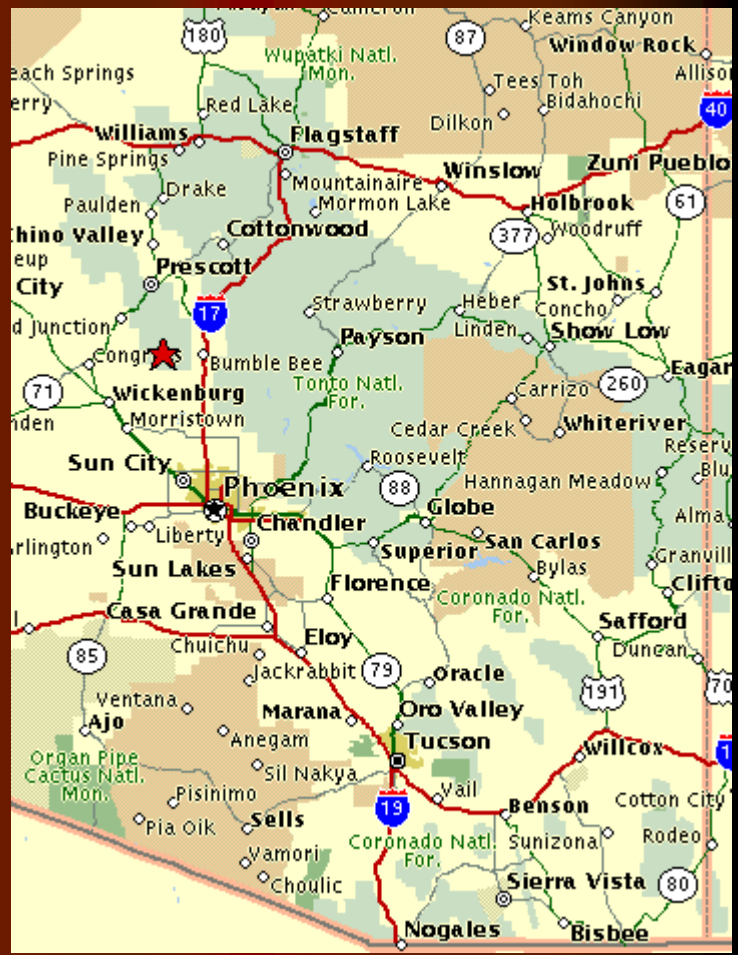
RMSF in new vector

- *Rickettsia rickettsii* human cases associated with heavy infestations of brown dog ticks (*Rhipicephalus sanguineus*) in northeastern AZ
- Instead of *Dermacentor variabilis* (American dog tick) OR *Dermacentor andersoni* (Rocky Mountain wood tick)



RMSF Serosurvey of Dogs

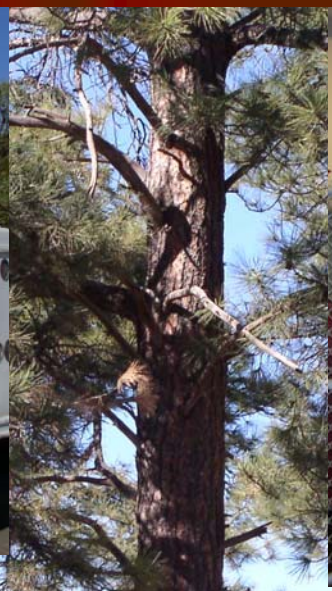
- Serosurvey designed to evaluate geographical distribution of RMSF in AZ
- 14 Animal control and humane society shelters in northeastern and eastern AZ
- Tick collection from dogs for species ID
- Serology for rickettsial organisms
- Site visit by CDC in fall of 2005



Logistics of Study

- ADHS provided majority of supplies to animal shelters, with some items provided by CDC
- A few local vets or vet techs involved in collection of specimens
- CDC staff visited shelters to provide specimen collection training
- CDC will be processing all specimens

Visit to shelters



Status of survey

- As of March 3rd:
  - 9 out of 14 shelters have submitted specimens
  - Only 7 ticks samples submitted (winter)
- 236 blood specimens submitted:
  - Coconino Humane- 80
  - Gila – 6
  - Graham – 1
  - Greenlee – 39
  - Holbrook – 3
  - Payson – 40
  - Pinal – 26
  - Springerville – 3
  - White Mtn Humane - 38

Continuation of Survey

- Serology results on initial samples- soon available from CDC
- As spring arrives in mountains of AZ- tick samples will continue to be accepted at CDC

Rhipicephalus sanguineus
Brown dog tick (male)

(Florida Univ. Institute of Food and Agricultural Sciences)

Brown dog tick (female)

(Florida Univ. Institute Food and Agricultural Sciences)

Petting Zoos & Animal Exhibits

Why the increase in concern?

- E. coli O157:H7 outbreaks associated with traveling petting zoos at fairs:
  - NC - late 2004- 108 cases, with 15 HUS
  - FL – spring 2005 – 63 cases, with 7 HUS
- Media covering outbreaks at the same time as new version of compendium from NASPHV released
- *Compendium of Measures to Prevent Disease Associated with Animals in Public Settings, 2005*

- Inside Edition article: "[E.J.] needed a kidney transplant after contracting E. coli 0157 at a petting zoo."

Outbreaks associated with petting zoos

- early July 2005- ADHS contacted by a zoo with concerns that *E. coli* O157:H7 may be present in their petting zoo animals
- parent of 7 y.o. child hospitalized with enterohemorrhagic illnesses caused by *E. coli* O157:H7 called zoo
- child had visited petting zoo 3 days prior to onset of diarrhea

Arizona investigation

- Fecal samples & rectal swabs of petting zoo animals submitted to ASPHL
- negative for shiga-toxin producing *E. coli* at ASHL

Arizona Investigation

- 2nd hospitalized pediatric case of *E. coli* O157:H7 with same pulsed-field gel electrophoresis (PFGE) pattern as 1st case
- 3 year old, from different county, visited the zoo but did not enter petting zoo
- No common food or beverage had been consumed by both children at the zoo
- both children had played in a water play area immediately adjacent to & downhill from petting zoo

Arizona Investigation

- Upon consult with NC & Florida public health & agricultural officials, additional fecal & environmental samples were collected
- submitted to USDA Meat Animal Research Center for culture

Arizona Investigation

- Feces from 15 of 25 (60%) animals positive for *E. coli* O157:H7
- 12 goats, 2 pigs, & one dwarf zebu cow
- 12/15 isolates matched each other & 2 pediatric cases on PFGE
- Enhanced surveillance: No other *E. coli* O157:H7 cases linked to zoo
- review of PFGE patterns from all other 2005 *E. coli* O157:H7 cases: no other cases with a similar pattern

Decontamination

- Immediately, zoo closed petting zoo & adjacent play area to public
- decontaminated area where 2 children played and petting zoo areas

Decontamination

- After “baking” soil, soil samples were submitted to USDA
- Negative for E. coli O157

MMWR

- NC, FL, & AZ outbreaks associated with petting zoos
- AZ's is different as associated with a fixed petting zoo, at an established zoo
- Petting zoos as zoos were considered lower risk because animals not traveling (less stress) & more of a closed herd
- Based on study of petting zoo animals at zoos- survey done by testing fecal samples
- Result of AZ investigation- no petting zoo immune to risk

Comparison

- Estimated 800,000 in attendance in NC state fair
- Estimated 65,000 visited zoo in AZ in two months leading up to onset of 2 human cases
- Setting different- zoo vs. fair (more or less children visit?)
- AZ- hot & dry
- State fairs tend to have more livestock species on premises & animals traveling

Lessons Learned

- As stated in a report by North Carolina Division of Public Health:
  - “Exposures from direct contact between petting zoo visitors and animals or manure might have already led to infection before hand-sanitizer use, or contamination may have occurred in areas that hand hygiene may not have removed.”
  - “Children who became ill were over 5 times more likely to fall or sit on the ground than children who did not fall or sit on the ground in the petting zoo.”
- highlight need for adult supervision of children < 5 yrs old, to discourage **hand-to-mouth contact**, and help **prevent falls** of young children to the ground within the animal exhibit

Decreasing the Risk

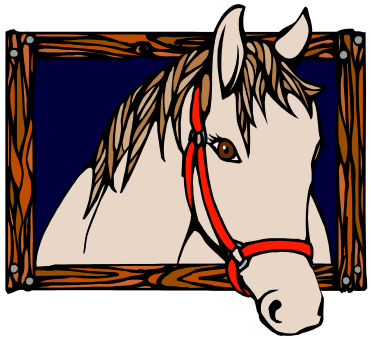
- Need to encourage petting zoo operators to set up exhibit so that children cannot walk into animal pens or other direct, open interaction area

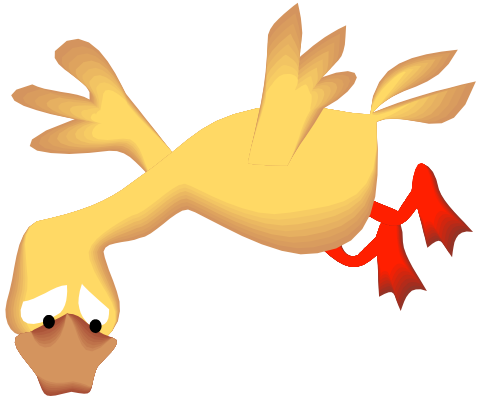
Decreasing Risk

- Drainage from animal housing- not into an area where visitors eat or play

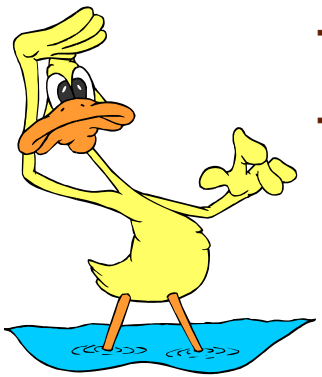
NO FOOD OR DRINK

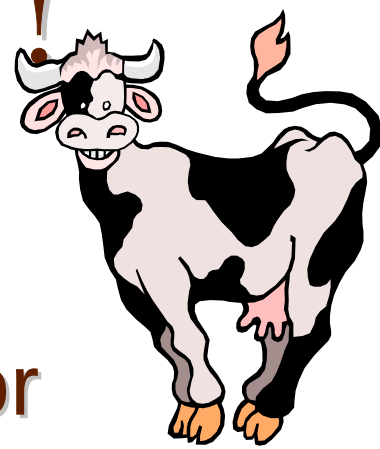
NO PACIFIERS, TOYS, OR SMOKING in Animal Area





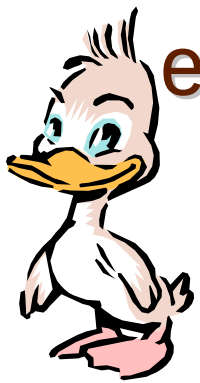
Wash Your Hands after Petting the Animals !

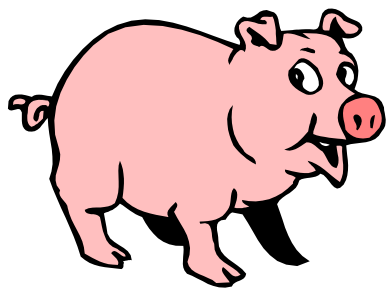




Please tell your children:

"No hands in the mouth, nose or eyes u[illegible]then!"





Farm/Ranch Visits

- Case of listeriosis reported that during entire incubation period, stayed in guest ranch in Greenlee County
- Guest ranch allows guests to milk cows & drink the raw milk, if they desire
- County health department educating ranch owners on risk

Questions?

Questions?

Arizona Department of Health Services

Salmonellosis - Turtles

- 1970s - salmonellosis associated with small pet turtles- major public health concern
- 1975 – FDA banned commercial distribution of small turtles (carapace of <4 inches)
- FDA ban prevents ~100,000 cases/yr among children
- a recent resurgence in sale of small turtles

Wisconsin & Wyoming Outbreaks

- Wisconsin & WY, @ least 6 human cases of salmonellosis -linked to such turtles
- 4 patient isolates of *S. pomona* & H2O from turtle habitat matched by (PFGE) at the Wisconsin State Laboratory of Hygiene; 2 more recent cases under investigation
- All children had recently purchased small turtles at Wisconsin tourist destinations
- enhanced surveillance by searching the PulseNet database for matching isolates- identified 140 cases total of 3 distinct serotypes of S. pomona and 2 distinct serotypes of S. typhimurium, which have been linked to pet turtles since this outbreak began

Salmonellosis - Turtles

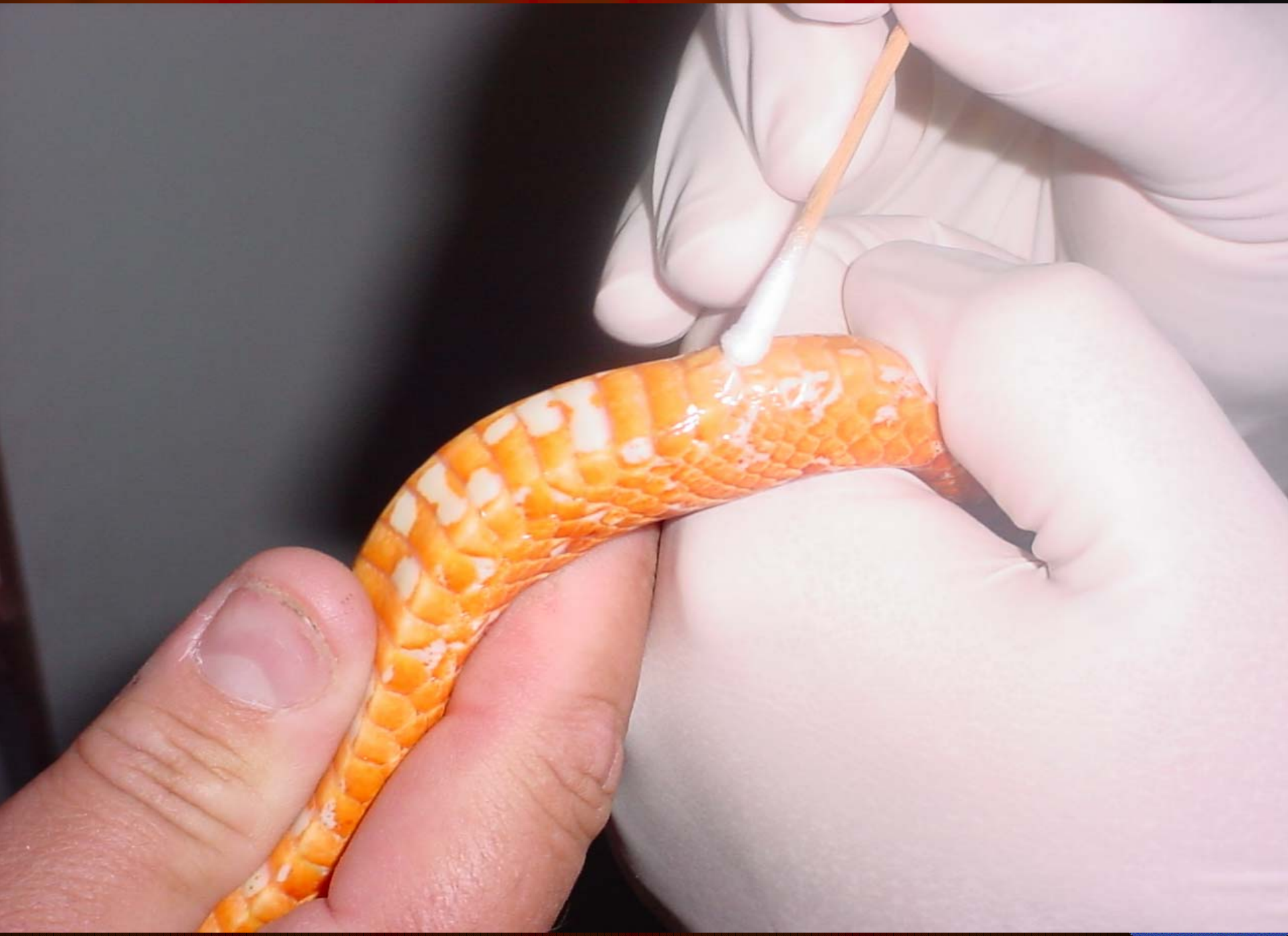
- Contact with reptiles & amphibians accounts for ~74,000 (6%) of ~1.2 million sporadic human *Salmonella* infections that occur annually in U.S.
- highlight need for local health & environmental officers to be aware that illegal distribution of small turtles might be widespread
- Investigators in Wisconsin & Wyoming discovered: many retailers aware of FDA ban but attempted to circumvent by giving turtles away with purchase of turtle habitat or by claiming that turtles were being distributed for educational purposes only
- Such practices = banned under 21 CFR 1240.62

Salmonellosis - Turtles

- FDA authority to enforce 21 CFR 1240.62 has been moved to the Center of Veterinary Medicine
- Recent episodes
- Therefore, FDA more strongly enforcing

Reptile Association Salmonella County Public Health Investigation

- 3 family members - positive for *Salmonella* Typhimurium
- Family ran an unlicensed daycare service from home & owned a snake
- county public health officials were concerned about potential exposure risks
- cloacal swab from the snake



Slither Did it

- Cloacal swab yielded Salmonella Typhimurium
- Cloacal isolate & isolates from family members matched on PFGE at Arizona State Health Lab
- Family educated concerning safe reptile handling & laws concerning reptiles in homes providing daycare

Tularemia from Hamster Bite

- April 2004 - Colorado DOH received report of 3 yr old boy dx with tularemia associated with hamster bite
- Tularemia has not been associated previously with pet hamsters
- 6 hamsters owned by boy had died of “wet tail disease” w/in 1 week of purchase
- Pet store reported unusual high # of deaths among hamsters - Jan – Feb
- All carcasses had been disposed of
- 1 pet cat + serology 1:256
- Trace back of hamsters to breeders – no illness among hamsters
- Confirmation of hamster as infectious source was limited by delay b/w patient’s illness onset & diagnosis
- No other risk factors for tuli exposure were identified

Office of Infectious Disease Services

Compendium - guidelines

- Hand hygiene – most important
- Signage educating visitors at entrance & exit
- Storage for personal belongings -left outside of exhibit
- Docile, domesticated species
- Adult animals preferably
- Sinks with running water & soap at exit are logistically difficult, but important

Avian Influenza

H5N1 in Asia could lead to next human influenza pandemic

HUMAN INFECTION WITH AVIAN INFLUENZA

- **1997 Hong Kong H5N1 18 ill, 6 died**

1st time an avian influenza virus found to transmit directly from birds→ humans

- **2004 Viet Nam H5N1 23 ill, 15 died**
- **2004 Thailand H5N1 10 ill, 7 died**
  - **Total for outbreak in 2004: 34 - 23 fatal**

H5NI in 2004 Poultry

- Unprecedented outbreak – so many Asian countries affected at same time by same virus
- In 2 month period>100 million birds have died or culled in Asia
- Greater than total # of poultry affected in the world's previous five largest outbreaks combined
- Therefore, huge viral load in environment

As of April 2005

- **Cumulative # Confirmed Human Cases of Avian Influenza A/(H5N1)**
- **since Jan 28th 2004**

Country/ Territory	Total	Deaths
Cambodia	2	2
Thailand	17	12
Viet Nam	60	35
Total	**79**	**49**

Avian Influenza – Viet Nam

- WHO update – April 4
- Since mid-December 2004:
  - Viet Nam has reported 33 cases of H5N1 avian influenza, 15 fatal
- family clusters – suspicious for human to human transmission; most likely from same exposure source (chickens)
- currently NO evidence H5N1 virus is spreading easily from person to person

Mycobacterium bovis & Public Health

Calf in state positive for TB

Not a threat to humans, officials say

By Kerry Fehr-Snyder
The Arizona Republic

A calf in Pinal County has tested positive for tuberculosis but never gave milk and poses no risk to humans, the state agriculture department said Monday.

The calf was part of a 300-head herd that is scheduled to be shipped out of state. The herd was placed under quarantine.

Regulators won't know until Wednesday whether any of the animals will have to be destroyed.

"We care because people will hear that a cow tested positive for tuberculosis and might panic and think, 'Oh my gosh,' " said Rae Chornenky, legislative liaison for the Arizona Department of Agriculture.

But two safeguards, pasteurization and proper cooking of meat, protect humans from contracting tuberculosis, a highly contagious disease characterized by a nagging cough. Meat must be cooked to an internal temperature of 160 degrees to kill the bacteria.

"It's important to understand that this animal was too young to produce milk, so there is absolutely no reason to question the safety of our current milk supply," said Kevin Rogers, president of the Arizona Farm Bureau.

An individual who consumes milk or meat from TB-infected cattle doesn't necessarily develop the disease. But that individual will have been "exposed" and possibly have to take antibiotics.

Federal officials require cattle being shipped from one state to another to undergo routine testing for tuberculosis. The last time Arizona had a tuberculosis-infected cow was in 1979, Chornenky said.

"All cattle are tested for just this reason, to be certain that this disease isn't present, and if it is present, we catch it an isolate it immediately," she said.

The state will have 90 days to prove that the disease has been eliminated from the herd and did not spread. If it misses the deadline, the state may lose its status as TB-free until it can prove the bacterium is no longer present in its cattle.

That's what happened in 1979. It took two years for Arizona's status to be reinstated, Chornenky said.

The TB-infected calf comes less than three weeks after a cow in Washington state tested positive for mad-cow disease.

"It's been a tough time" for U.S. cattle ranchers, Chornenky said.

Outbreaks associated with petting zoos

- 2004 – North Carolina State Fair
- 107 cases reported
  - 44 confirmed, 9 probable, 57 suspected
  - 13 hospitalized with HUS
  - cause of outbreak: attendance @ NC State Fair
  - Environmental cultures, multiple sites @ fairgrounds: presumptive positives *E. coli* O157:H7
  - high concentration of + results were detected in cultures obtained from the location of one of the petting zoos

Outbreaks associated with petting zoos

- 2005- Central Florida Fair - Orlando & Strawberry Festival - Plant City
  - 15 confirmed cases of *Escherichia coli* O157:H7 associated with attendance @ one of 2 Florida fairs
  - 14 hospitalized, some with HUS
  - Investigation of all types of exposures:
    - food and beverage consumption, petting zoos, animal rides, animal exhibits, animal races, interactive milking cow demonstrations (simulated and real) and environmental exposures

HUMAN INFECTION WITH AVIAN INFLUENZA

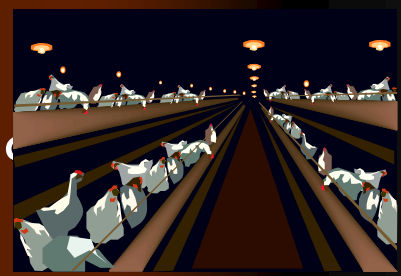
- **1997**: Hong Kong (H5N1) infected both chickens & humans:
  - 1st time an avian influenza virus found to transmit directly from birds→ humans
  - 18 people hospitalized, 6 of them died
  - 1.5 million chickens killed
  - spread primarily from birds → humans, though rare person-to-person infection was noted

AVIAN INFLUENZA A

- **all known subtypes of influenza A viruses circulate among wild birds - natural hosts for influenza A viruses**
- **All birds susceptible**
- **Wild ducks**
  - Natural reservoir
  - Most resistant
- Poultry most susceptible
- **shed virus in saliva, nasal secretions and feces**

Avian Influenza – Poultry US

- Highly pathogenic vs. low pathogenic – lab result criteria (may not correlate with mortality rate)
- HPAI
  - rare (only 21 outbreaks since 1959); only 1 outbreak spread to other countries
  - H5 & H7= only subtypes implicated in outbreaks of highly pathogenic disease
- Low pathogenic outbreaks are frequent in U.S. & worldwide
  - **e.g. H7N2 in Delaware**: among poultry
  - significantly different from H7N7 virus -Netherlands in 2003

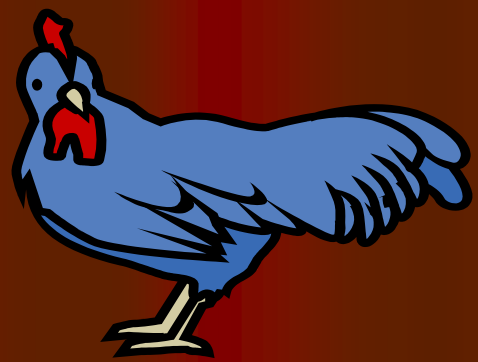


CONCERN WITH AVIAN H5N1

- Co circulation with human influenza
- Prone to mutate
- High pathogenicity
- High fatality rates in humans
- Dangerous if can spread person-to-pers
- No vaccine
- Genes still of avian origin as of 3/04/2004
- antiviral resistance to amantadine & rimantadine; remaining 2 antivirals (oseltamavir and zanamavir) should still be effective against this strain of H5N1

H5NI in 2004 - Poultry

Outbreaks of avian influenza A (H5N1) confirmed among poultry in:



- South Korea * Dec. 2003
- Vietnam
- Japan
- Thailand
- Cambodia
- Hong Kong (in a single peregrine falcon)
- Laos (H5)
- China
- Indonesia

Human Infection w/ Avian H7 Poultry Workers

- Suspect human infection in VA in 2002 (H7N2)
- March 2004 reports of avian flu infection in poultry workers in Canada (H7N3)
- Conjunctivitis and/or upper respiratory presentation described
- H7N7 outbreak in Netherlands in 2003, caused illness in 83 poultry workers- included one human death (vet)
- risk of infection to poultry workers is low, especially when persons wear appropriate PEP & follow standard depopulation procedures

Another AAHA effort

- ***PSA Educates Pet Owners on Zoonotic Threat & Encourages Regular Veterinary Visits***
- AAHA recently teamed up with a veterinary product manufacturer
- PSA: "Protect your pets. Protect your Family"
- dangers of zoonotic diseases
- encourages pet owners to consult their local veterinarian for more information about parasites & prevention
- PSA garnered over 28,000 T.V. & radio airings, reaching > 23 million people

Healthypet.com

AAHA AMERICAN ANIMAL HOSPITAL ASSOCIATION
Healthy Practices. Healthier Pets.

Zoonotic Disease

Zoonotic diseases, or diseases that can be transmitted from animals to people, are commonly caused by parasites like roundworms or hookworms that can be spread by infected animal waste left by animals in places like sandboxes, parks or your own backyard. Healthypet offers a frequently asked question and several pet care library articles that address zoonotic disease prevention.

Intestinal Parasites

External and Internal Parasites

Diseases Transmitted by Pets

Is it okay for my dog to lick my son's face?